5¢ A YEAR

October 10, 1953

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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

Autumn Leaves

See Page 234

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

an old-fashioned organic brought up to date . . . how to learn the fundamentals of radiography . . . hunting cosmic ray particles without a camera

The ant and the star

In the age of miracle drugs *Formic Acid*, simplest of carboxylic acids, appears in the *National Formulary*. As *Acidum Formicum*, it presumably possesses some old-fashioned pharmaceutical virtues as a counter-irritant and astringent. We sell it as Eastman 139, but not for this purpose at all. Although many Eastman Organic Chemicals *are* used in clinical investigation, we doubt that there is any great amount of such investigation in progress on *Formic Acid*. We suspect it is included in *N.F.* largely as a holdover from an older day when it was felt there must be medicinal value in a compound obtainable by so interesting a method as the distillation of ants.

The interesting thing about Eastman 139 for chemical purposes is the fact that it is considerably better than 98% *Formic Acid*. Most commercially available formic acid contains 10% of water. If you prefer it more anhydrous than that, then instead of seeking out a bulk supplier and persuading him to specially dehydrate a little of his formic acid for you, it's much simpler and quicker to put Eastman 139 down on your Eastman Organic Chemicals order. But, please, out of respect for the * that appears with each item in our catalog classed officially as a drug, append in good conscience the statement, "These chemicals will not be used for drug purposes or sold by us for such use."

Whether or not Formic Acid *is of immediate interest to you, you'll find over 3500 other highly purified Eastman Organic Chemicals in our "List No. 38." If you haven't a copy, write to Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).*

Radiography

We've just issued, in 100 pages, the rewritten eighth edition of "The Fundamentals of Radiography." The typical reader the authors had in mind is an intelligent and earnest young person who has never previously given much thought to the difference between an anode and a cathode but is willing to learn. Certain of the earlier pages you can probably afford to pass over rather quickly to get to the parts where we review the geometry of x-ray image formation, the effect of kilovoltage on what is shown, scattered radiation and its control, intensifying screens and how to use them, the

selection of film and processing procedures, calculation of exposures, how to get more contrast, how to get more detail, how in general to run a radiographic operation for consistently good results and maximum personal safety. The viewpoint is essentially that of the medical x-ray clinic, but the content can be useful elsewhere—to you yourself or to a newcomer you'd like to interest in the topic.

To get a copy of "The Fundamentals of Radiography," one simply drops a note to Eastman Kodak Company, X-ray Division, Rochester 4, N. Y. If, however indirectly, it results in an increment to the ranks of the radiographers, we shall feel amply rewarded.

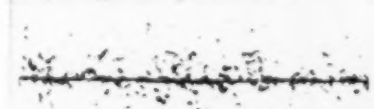
Hobby?

Not only is there no need for a camera with *Kodak Nuclear Track Plates and Pellicles, Type NTB3*, but one doesn't even need to open the original shipping package to expose them. Their function is to pick up developable tracks of the ceaseless, silent rain of cosmic ray particles that stream through the atmosphere —electrons, protons, deuterons, mesons of the several breeds, positrons, multiply charged heavy ions, V-particles, etc.

(The number of species seems to grow with every meeting where high-energy physics is on the agenda; the theoreticians are way behind on their explanations.)

Any wrapping material we can put around the emulsion not only fails as a shield but even acts as a source of additional ionizing particles knocked out of the material by cosmic radiation. This makes *Type NTB3* just about our most perishable product. We keep no stock, even wait till the last moment to make the emulsion, get it to the physicists by the fastest means, and warn them to process as soon as possible.

Associating *Type NTB3* with urgency in our minds, we hadn't thought till just the other day of a leisurely experiment with them: let us, we said, simply leave a few dozen packages of *NTB3* plates and pellicles on the lab roof for a while, somewhat after the casual manner in which M. Becquerel opened the field of nuclear physics. After processing, will we find tracks of interesting particles and events? How much searching with a good high-power microscope will it take to find the interesting tracks against the



camouflaging background of secondary electron tracks that the professionals avoid by exposing in high-altitude balloons? We'll let you know if we find anything that might be encouraging to the dedicated amateur.

A dozen 1" x 3" Kodak Nuclear Track Plates, Type NTB3 *cost $6.40 in 25-, 50-, or 100-micron emulsion thickness. Orders are placed with a local Kodak Industrial Dealer, whose name is obtainable from Eastman Kodak Company, Industrial Photographic Division, Rochester 4, N. Y. Larger sizes, 150- and 200-micron emulsions on plates, and pellicles cost more. A pellicle, by the way, is a sheet of unmounted emulsion one-quarter millimeter thick.*

Price quoted is subject to change without notice.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

Kodak
TRADE-MARK

DENTISTRY

Toothbrush Wins Out

Six dental authorities agree that no dentifrice yet developed can prevent tooth decay or gum disorders. They recommend proper use of toothbrush.

► THE TOOTHBRUSH, properly used, does more to keep the teeth and gums healthy than any medicine or chemical put into tooth pastes and powders, from enzymes to penicillin.

This sums up the opinions of six dental scientists at the meeting of the American Dental Association in Cleveland. Among the scientists were some who have been working on dentifrices with special chemicals in them intended to check decay.

All agreed that a dentifrice that has been proved to prevent tooth decay or gum disorders has not yet been developed, although some are being tested with the hope that they may prove effective.

Here, briefly, is what the experts said:

Dr. Leonard S. Fosdick, Northwestern University Dental School, Chicago, who has been studying enzyme "inhibitors":

"During the past 10 years, the American public has been led to believe that by brushing the teeth with various types of preparations, dental caries could be prevented. Unfortunately, the expectations as aroused by clever advertising have not been fulfilled. Before any final conclusions (on the anti-enzyme approach) are reached, clinical tests must be performed wherein the actual incidence of carious lesions (decay) is determined. Actually, clinical experiments of this type are now under way, but as yet no information is available to indicate the effectiveness of these compounds against clinical caries."

Dr. John W. Hein, School of Medicine and Dentistry, University of Rochester, N. Y., on chlorophyll dentifrices:

"Never has a substance been so exploited and prostituted by ridiculous applications. It is evident that the use of chlorophyll derivatives as caries preventive agents is still very much in the laboratory stage. Any inference that these agents are effective against human tooth decay is pure speculation. Since salivary flow rapidly decreases the concentration of agents in the oral cavity, claims which suggest that chlorophyll derivatives give a protective deodorizing effect in the oral cavity of several hours duration should be viewed with suspicion."

Dr. Robert G. Kesel, University of Illinois School of Dentistry, Chicago, who has worked on ammoniated dentifrices:

"The work being conducted and other work which is contemplated are designed to bring out more fully the role of these agents in relation to other potentially caries-inhibiting substances and dentifrices."

Dr. Helmut A. Zander, University of Minnesota School of Dentistry, on antibiotics such as penicillin and aureomycin:

"Unfortunately, I cannot state in the affirmative that any dentifrice ever will be a therapeutic agent. At present penicillin dentifrices are sold only on a prescription basis and are recommended primarily for cases of rampant caries or for use under a strictly supervised regime."

Dr. Albert H. Kniesner, Western Reserve University School of Dentistry, Cleveland:

"Both positive and negative reports concerning the effects of medicated dentifrices on dental caries appear in the literature. Until corroborated clinical evidence from several reliable sources is forthcoming, 'prescription pad' control of dental caries cannot be accepted as an established office procedure. The judicious use of the toothbrush rather than the type of dentifrice will contribute to the maintenance of healthy gingiva (gums)."

Summing it all up, the moderator of the discussion, Dr. Thomas J. Hill, Western Reserve University School of Dentistry:

"It is not definitely established that the dentifrices as used by the public materially decrease the dental caries (tooth decay) rate because of any specific therapeutic substance incorporated in them. It would appear that the present advertising claims of dentifrices are inclined to lead the public to put too much faith in some incorporated ingredient rather than on the prophylactic (cleansing) value of the dentifrice."

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DENTISTRY

Use Anesthetic for First Cavity Filling

► TO PREVENT nervous shock when a child has his first tooth cavity filled, the dentist should use a local anesthetic, Dr. George W. Teuscher, dean of Northwestern University Dental School, Chicago, advised members of the American Dental Association meeting in Cleveland.

This is the rule in the children's dental clinic of one school, he said.

The patient's need, rather than his age, should determine whether a local anesthetic is given when a cavity is filled. In many cases, Dr. Teuscher said, it is best for the child never to experience the "discomfort" of having the cavity drilled to prepare for filling it.

"One such experience is enough in these cases to upset the patient permanently," he declared. "A careful introduction to local anesthesia, even in the very young child, would prove less dangerous than operating without anesthesia."

SILENCE MADE-TO-ORDER—Sound absorbing wedges of glass wool are installed in a new echo-free chamber at Indiana University by Prof. James P. Egan of the psychology department. Completely lining the room, they will "soak up" all but a thousandth part of sound striking them.

General anesthesia for prolonged dental operations, Dr. Teuscher said, is particularly useful in very young children with a large amount of dental work to be done, children who cannot be managed successfully in a conscious state, children with cerebral palsy, mentally retarded children, and those with heart conditions who must avoid undue fear.

Children and grown-ups alike can be assured of safe and effective dental anesthetics, Dr. Sidney Epstein of the School of Dentistry, College of Physicians and Surgeons, San Francisco, declared.

But even with the effectiveness of the drugs, the dentist still has to use some psychology with patients who think they feel pain when they actually do not, Dr. Epstein said.

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DENTISTRY

Cold Sores, Fever Blisters Hit Over Half Population

► MORE THAN half of the population has suffered fever blisters or cold sores, Dr. John B. Macdonald of the University of Toronto division of dental research declared at the meeting of the American Dental Association in Cleveland.

The condition, termed scientifically herpes simplex, is caused by a virus. Aureomycin ointment, he said, controls many of the symptoms of virus infections, though there is no specific antibiotic treatment for them.

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DENTISTRY

Dentists Drill Fast To Hurt Patient Less

► WHEN A dentist drills at high speed to prepare a cavity for filling, it hurts less and is less tiring to the patient, Dr. Donald C. Winans of the University of Michigan School of Dentistry told members of the American Dental Association meeting in Cleveland.

"We now have some newer cutting aids that, if properly used, will reduce to a minimum the most irritating and destructive forces in operative dentistry—heat, vibration and pressure," he said.

An abrasive machine was one of the cutting aids he described. It utilizes gas propulsion to blast an abrasive material through a small nozzle for cutting. The material travels at supersonic speeds of more than 1,000 feet per second to blast out cavities rather than grinding them out.

While airbrasive equipment can not duplicate all the work of the commonly-used rotary drill, it is valuable in cutting through enamel and removing stains and heavy deposits, Dr. Winans said.

With the new high speed drills, greater heat is generated, but this can be controlled very simply by use of a water and air spray.

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METEOROLOGY

Smoother Airplane Rides

► AIRPLANE PASSENGERS would have "considerably" smoother rides than at present if transport planes were equipped with radar, Dr. H. B. Tolefson states.

A meteorologist at the National Advisory Committee for Aeronautics Langley Aeronautical Laboratory at Langley Field, Va., Dr. Tolefson estimates that heavy, passenger-throwing gusts would be met about one-eighth as frequently as now by using the radar equipment. Another advantage of radar in planes, he states, is that designers and operators of transports could safely design airplanes for an approximate 10% reduction in the maximum gust loads.

The radar equipment would aid in two ways: 1. Some thunderstorms could be spotted and completely avoided. 2. The least turbulent paths through unavoidable storms could be charted. A contour attachment for the radar is needed to pick the smoothest route through unavoidable thunderstorms. Dr. Tolefson has found that, within storms, the areas of greatest turbulence are usually found where the rainfall is making a sharp change from light rain to heavy rain.

The number of times an airplane encounters, in clear air, the small and more numerous gusts that eventually cause discarding of airplanes cannot be reduced using radar equipment, Dr. Tolefson concludes.

Sufficient turbulence to throw passengers from their seats is met, according to Dr. Tolefson, when the change in wind speed is about 25 feet per second at the cruising speed of a modern transport, which ranges from 200 to 300 miles an hour. A 25-foot-per-second gust is encountered once in about 80,000 miles under present operating conditions.

If the thunderstorms could be avoided, Dr. Tolefson states in the *Bulletin of the American Meteorological Society* (May), such gusts would be experienced once in about 600,000 flying miles, or only once over a distance nearly eight times as great as that which included flight through thunderstorms.

ENGINEERING

Florida's White Sand To Yield Black Ilmenite

► THE WHITE, sandy land of north central Florida soon will be made to yield greater amounts of jet-black ilmenite, the ore from which tough, heat-resistant titanium metal is extracted. A new mine and processing plant will be constructed near Lawtey to help the Du Pont Company meet the increasing demand for the metal and its pigments. One plant already is situated in the area.

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"By making allowances for the cases where storms could not be avoided, the passenger might still expect a rough ride on approximately 20 to 25% of the rough flights he experiences under present conditions. It would appear, therefore," Dr. Tolefson concludes, "that quite a sizeable increase in passenger comfort would be obtained on radar-equipped transports."

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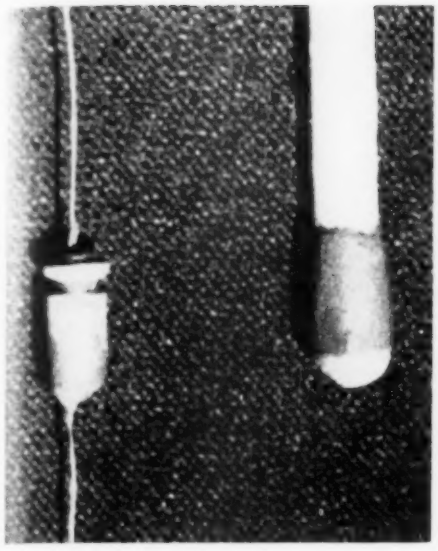

TINY CAPACITOR — For use in such miniature electronic equipment as wrist radios and hearing aids, this minute capacitor compares in size to the head of a match. Meauring one-eighth inch in diameter, it can filter current to eliminate most static.

HORTICULTURE

Fluorescent Light for Basement Gardens

➤ YOU CAN start flower or vegetable seeds or cuttings in your own basement the year around by installing fluorescent lighting.

Dr. V. T. Stoutemyer, professor of floriculture and ornamental horticulture at the University of California at Los Angeles, speaking before the American Society for Horticultural Science in Madison, Wis., told of propagation experiments involving seedage and grafting under this form of artificial illumination.

He said that most flower or vegetable plants or shrubs could be started from seeds or cuttings by these methods. Such techniques would be particularly valuable to amateur gardeners who could use them in basements or storage rooms.

Seedlings were started on sphagnum moss and were transplanted at an early stage to a mixture of composted soil, coarse sand and Michigan peat. About 16 hours of light a day seemed to be the most satisfactory. With automatic time switches, the seedlings or cuttings demanded little attention if sufficient light intensity was provided.

Plants used in the study included cabbage, tomato, parsley, eggplants, petunias, zinnias and grafts of hemlock, rhododendron and Colorado blue spruce. All propagated well under the artificial illumination techniques.

The studies were performed in collaboration with Dr. Albert W. Close, formerly with the U. S. Department of Agriculture, now retired.

PHYSICS

Cooler H-Bomb Starting

Speculation that starting mechanism for the hydrogen bomb need not involve temperatures on the order of a million degrees from an A-bomb blast is not new.

➤ SPECULATION THAT the hydrogen bomb can be made without using the older and less powerful atomic bomb (fission of uranium or plutonium) as a trigger is not really new.

Last year (see SNL, July 12, 1952, p. 18) SCIENCE SERVICE carried a report that it was considered possible that a starting mechanism for the H-bomb's thermonuclear reaction need not involve the conventional atomic bomb with its temperature of the order of a million degrees.

Suppose a lower temperature, say a few hundred thousand degrees, would start the conversion to energy of some of the mass of hydrogen atoms (whether the common sort of mass one plus, or the double weight deuterium, or the triple weight tritium). Then the required intense spot of heat might be provided by a fine metallic wire exploded by a shock of electricity.

This possible trigger of the H-bomb was forecast by exploding wire experiments at Mt. Wilson Observatory in the 1920's, when attempts were made to duplicate here on earth the temperatures and the light of the stars.

Such a non-A-bomb trigger might very well break the monopoly that uranium now has on atomic bomb production. Hydrogen is widespread in the world. The ordinary and double sort is in every drop of water. Even less technological nations than the United States and Russia might undertake H-bomb development with relatively limited resources.

For future power for industry, such possible developments may have more interest and promise to the world than for military might and destruction, if war can be avoided. Easier starting of the H-bomb fusion, or conversion of mass into energy, if combined with control of the rate of fusion, would give a great new source of power for war and peace, unhampered by the scarcity of uranium.

Experiments in 1949 from the Los Alamos AEC Laboratory actually produced power from the fusion of hydrogen atoms on a small scale. Since work on the hydrogen bomb began well over a decade ago, even before the fission atomic bomb was proved practical, some very important and practical developments may very well have been made and remain hidden under the cloak of atomic secrecy.

Such industrial and power applications of converting mass into energy via the hydrogen fusion reactions should be more important than the making of bombs. But in the present state of the world a relatively easy and cheap H-bomb would obviously throw more fear and apprehension into our military and political leaders than Russia's possession of the kind of super uranium-triggered H-bomb we have assumed has been exploded.

If the public is given solid scientific facts, of the sort that the famous Smyth report of 1945 gave about the atomic bomb, apprehension bordering upon public panic may be avoided. The heralded Operation Candor may be sufficiently candid.

If the safety of the future must depend upon the behavior of any small group in this compact world of ours, we had better know the worst in order that we may, even this late, build up psychological defenses.

BIOLOGY

Embryos Develop in Eggs of Virgin Turkeys

➤ LIVING, FATHERLESS embryos have developed in 15% of all eggs laid by experimental virgin turkey hens at the Agricultural Research Center of the U. S. Department of Agriculture in Beltsville, Md., it has been disclosed.

This may be the first case of parthenogenesis, which is the development of embryos without fertilization by the male, to be observed in birds or higher animals, Dr. M. W. Olsen and S. J. Marsden of the Bureau of Animal Industry report. Parthenogenesis is known to occur as far up the animal scale as frogs or even fish, but no higher, they said.

In 98% of cases of fatherless embryos, embryonic development was disorganized, a translucent membrane simply spreading over part of all of the egg yolk. None of the embryos ever lived more than seven days, and usually stayed alive only two to four days. This discovery may have significance for medical science.

The scientists believe that the abnormal growth of tissue where none should develop might be of interest to cancer research. It is possible that hormone imbalance, traceable perhaps to the pituitary gland, explains the parthenogenic eggs, they say.

With turkey eggs costing 25 cents each, the question of parthenogenesis should be of interest to hatcherymen. They have found a discouragingly large number of fertile-looking eggs never hatching out. Actually, many of these fertile-looking eggs, because of parthenogenesis, might never have been fertile at all.

PSYCHIATRY

Not Necessarily Commie

Neither espousal of communism nor mental sickness, psychiatrists believe, are necessarily involved in signing of false confessions by POWs.

► THE MEN and officers who yielded to terrific Communist pressure in POW camps and signed false confessions or informed on fellow prisoners have not necessarily espoused communism and neither must they be considered mentally ill, in the opinion of psychiatrists.

No one knows exactly how much mental torture and pressure a particular man can withstand before he will give in to the demands made upon him, but presumably every man has his own limit beyond which his will must crack up. The process the prisoners were put through in POW camps may be compared with what psychologists call "conditioning."

The remedy is "deconditioning." In experiments on conditioned dogs, Dr. W. Horsley Gantt of the Johns Hopkins University School of Medicine in Baltimore found that the best way to decondition his animals was to take them out of their cages and remove them completely from the scene of conditioning—away from all sights, sounds and smells associated with it.

If the "conversion" of the POW's to Communism was not an intellectual process, but the result of emotional pressure, lectures and arguments may be expected to have relatively little effect. On the other hand, a single dramatic incident might be enough to straighten out a man's mixed-up mind and fear of going home to friends and companions.

One colonel reported that just the sight of an old and good friend who met him at Freedom Village holding a cap with his eagle on it was enough to dispel all his apprehension and confusion.

The Communists are known to "condition" their prisoners by first reducing them physically by hunger, extreme fatigue, bright lights and constant questioning. The prisoner may be kept sitting on a stool under bright lights and subjected to constant haranguing until he is ready to sign anything. Cardinal Mindszenty was said to have been kept standing for more than 66 hours until his legs and feet were so swollen that he fell.

Men have been kept in solitary confinement until they reached the point where they were in abject despair and felt that no one would know or care what they signed or whether they lived or died.

Favorite trick of the "brain washer" is to rouse and play upon any unconscious guilt feelings of his victim. This is pointed out by Dr. Joost A. M. Meerloo, New York psychiatrist who has made a special study of brain-washing, confession-extorting techniques that are used by all police states.

The prisoner is reminded of hostile feelings he may have had as a child against a father who punished unjustly or overstrictly, or against a rival brother. Old, suppressed feelings of guilt are revived by accusations against fellow prisoners.

Under the pressure of extreme emotion, and confused by his secret feelings of guilt, the prisoner may be unable to tell the difference between fantasied or suggested guilt and a real criminal act. With this confusion produced in the mind, the prisoner is readied for the confession. He may not only avow his own crimes but may denounce his companions.

Second step in the "processing" of the prisoner is to train him to accept his own confession. False admissions are re-read, repeated, hammered into his brain. First his own statements are read to him, then statements of other prisoners accused of complicity with him.

In the first step he was hypnotized by others. In the second step he is forced to hypnotize himself until he is weakened to the point of repeating all his admissions over and over when told to do so.

In the third stage, the victim, completely confused and conditioned to accept his own guilt, is trained to bear false witness against himself and his companions.

By this time he is completely without hope, all belief in a future.

During the process of the conditioning, the brain washer may give narcotics to confuse the prisoner's mind. Stimulants may be given to prevent his escape into unconsciousness.

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GEOLOGY

Extinct Animals Roamed Alaska 12,000 Years Ago

► EXTINCT ANIMALS roamed Alaska until about 12,000 years ago, Dr. Troy L. Pewe of the Geological Survey in Fairbanks, Alaska, reported to the Fourth Alaska Science Conference in Juneau.

There were two glacial, or cold, periods, separated by a warm period in the Wisconsin age, which started about 100,000 years ago, his studies using radioactive carbon dating have shown. During each of the three periods, the last of which ended at least 12,000 years ago, the now-extinct animals, such as mammoths, mastodons and bison, lived "in abundance," Dr. Pewe reported to the conference.

The plants in Alaska during the central warm period were the same as found today. It was also, Dr. Pewe believes, "a favorable time for existence of man in Alaska."

Many geologists have thought that the climate during the glacial period was too severe for animals, and that they died off then, but radiocarbon dating methods have shown that the mammoth, mastodon and bison survived the last glacial period of the Wisconsin age before becoming extinct.

Bison that have recently been introduced, "now live wild in central Alaska where winter temperatures are at least minus 70 degrees Fahrenheit," Dr. Pewe pointed out. The climate in Alaska during the most recent glacial advance, less than 12,000 or 13,000 years ago, was somewhat similar to that of the present day. It was then that the permafrost and ice wedges now found there were formed.

Alaska's mountains were formed and its placer gold laid down in the period from about a million years ago to about 100,000 years ago.

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PSYCHIATRY

Anxiety State Chief Disease of Dentists

► IF YOU are tense and uneasy when you go to your dentist, so apparently is your dentist. You are probably afraid of being hurt. He is suffering from that vague, uneasy feeling which psychiatrists term the anxiety state.

This anxiety state is the chief occupational disease of dentists, Dr. Arthur Bernstein and Jacob L. Balk of Newark, N. J., report to the American Dental Association.

Their findings come from a study of 56 dentists seen over a period of years at the Newark Clinical Group.

A state of anxiety was the most common condition found among the dentists. It was present in almost half, 42.1%, of the group. In contrast, only 12.3% of other patients at the clinic suffered from the anxiety state.

Next most common afflictions of the dentists were stomach and intestinal disorders, with heart and blood vessel diseases ranking third. In this last respect, dentists seem to be more fortunate than doctors of medicine among whom heart and blood vessel diseases take a much higher toll.

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ENGINEERING

Rocket Motor Has Tons Of Real Get-Up-and-Go

► A ROCKET propulsion motor just developed in Schenectady, N. Y., has the power of two 2,000-horsepower locomotives. This General Electric motor may be applied to aircraft, torpedoes, gliders, aircraft catapults and landing craft.

It could be economically mass-produced and works on fuels that are plentiful, developing ten tons of thrust at full throttle.

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LABOR-SAVING DOLLIES—Rushing to complete the laying of two four-mile sections of 20-inch pipe along the bottom of Mackinac Strait before the winter freeze, contractors saved more than 100 miles of land clearing and ditching by crossing the 240-foot deep shipping channel with this submarine pipeline. The tires were used on pipe-launching devices that put pipe in the water at the rate of almost 1,000 feet per hour.

ENTOMOLOGY

Ice Tomb for Insects

► GRASSHOPPER GLACIER, a massive ice tomb for ancient grasshoppers 11,000 feet above sea level in the Beartooth Mountain range in Park County, Mont., is serving scientists as a great "natural" museum. It also doubles as a frozen-food storehouse for birds and fishes.

Scientists recently have found that great swarms of grasshoppers are still plunging down to icy deaths in the Montana glacier, Dr. Ashley B. Gurney, U. S. Department of Agriculture entomologist, reported to the Smithsonian Institution. As the ice eventually releases the insects, local birds and fish eagerly feed on the remains.

Although at one time some authorities thought the bottom layers of the glaciated grasshoppers were several thousand years old, tests just completed on a small sample of these grasshoppers indicate they might be 600 years old, although 300 years or less seems more probable. These tests, conducted by Dr. W. F. Libby of the Institute of Nuclear Studies, University of Chicago, were made by the radiocarbon dating method, using the radioactive carbon-14 content of the insects' bodies.

The grasshoppers arrive at the glacier by air after a journey of perhaps several hundred miles. However, the reason the grasshoppers land on the ice is a puzzle to scientists.

The most plausible explanation is that there is a sudden weather change as the swarm of insects passes over the glacier. Grasshoppers like to fly only when the air is warm. Swiftly dropping temperatures or sudden cloudiness often make them fold their wings and land. Even though they may be flying high above the cold air over the ice, they would feel the chilliness and act accordingly.

Within the glacier itself, only one grasshopper species has so far been identified. Called *Melanoplus mexicanus mexicanus*, it was well known in the 1870's and 1880's as a widespread migratory insect pest. Other migratory species of grasshoppers have been found in fresh condition soon after landing on the surface ice and snow of the glacier.

Further study of Grasshopper Glacier should supply more of the basic facts related to the history of modern North American glaciers as well as the movement of insect pests by air currents, Dr. Gurney states.

Science News Letter, October 10, 1953

MEDICINE

Aspirin Beats Antibiotics In Treating Colds, 'Flu

► AS MEDICINE for influenza and 'flu-like colds, aspirin rates better on a time and cost basis than the antibiotics, or so-called mold remedies, it appears from a report to the *Journal of the American Medical Association* (Sept. 26).

The report covers a study during an outbreak of influenza A-prime last winter at Chanute Air Force Base, Ill., by Capt. Philip N. Jones, Maj. Roy S. Bigham Jr. and Lieut. Phil R. Manning. Dr. Jones has been discharged from military service since the study was made and is now at St. Luke's Hospital, Chicago.

Neither aspirin nor the antibiotics used, terramycin and erythromycin, actually cured the influenza or 'flu-like colds. The Army doctors think most of the 150 patients had influenza but since tests were not made on all of them, they just call it an influenza-like condition.

Patients getting aspirin had normal temperatures, on the average, in 30 hours, while those getting terramycin had normal temperatures in 41 hours, and those getting erythromycin in 42 hours. Normal temperature was used as a sign of recovery since it could be measured and since patients felt entirely well when the temperature was back to normal.

While 11 or 12 hours difference in recovering from an attack of 'flu or a feverish cold is not great, the doctors point out that the quicker recoveries came with a much cheaper medicine. An aspirin tablet costs about one cent, while a capsule of terramycin sells at retail for about 35 cents and a tablet of erythromycin costs 32 cents.

Whether the antibiotics prevented development of secondary bacterial infection could not be told from the study. None of the patients, regardless of what medicine they got, developed any such complication.

Science News Letter, October 10, 1953

MEDICINE

1954 Will See Big Polio Vaccine Trials

► MASS PRODUCTION of a trial vaccine against polio and the "staging of the largest validity test (of the vaccine's worth) involving human beings in the history of the world" has been set for next year, 1954.

Basil O'Connor, president of the National Foundation for Infantile Paralysis in New York, so states in a letter to editors asking for cooperation in the 1954 March of Dimes fund-raising campaign.

The sum of $7,500,000 will be needed in 1954 alone for the vaccine production and trials, Mr. O'Connor says. In addition, $19,000,000 will be invested in gamma globulin which, "at least through next summer, will remain our only stopgap holding action against paralytic polio."

Science News Letter, October 10, 1953

BACTERIOLOGY

Animal Ailments Due to Same Type of Bacteria?

➤ SUCH ANIMAL maladies as fowl cholera, swine plague, rabbit snuffles, certain respiratory diseases in cattle, sheep, goats and buffaloes, and even certain rare cases of human meningitis, may all stem from a common source.

This has been suggested in research by Drs. David Rifkind and Samuel Pickett of the University of California at Los Angeles bacteriology department.

The source is a bacterium that has been carried under the general classification of the "animal" group of *Pasteurella*.

Strains of *Pasteurella* were collected from animals all over the world. Detailed biological and chemical studies indicated there were only two types of bacteria in the group. One type was so rare as to suggest that only the other was a major offender.

"Practical significance of this is that it may simplify treatment of such diseases among animals," the scientists reported. "For example, if penicillin is found to be effective against fowl cholera, there would be good reason to hope it would be equally effective against the other diseases. Previously, each of the diseases has been treated as if caused by a different organism."

The study is considered more significant in relation to veterinary medicine than to human medicine, as cases of human meningitis caused by *Pasteurella* are very rare.

Science News Letter, October 10, 1953

PUBLIC HEALTH

Cancer Chief Disease Killer of Teen-Agers

➤ CHIEF DISEASE that kills boys and girls in their teens is cancer. Ranking next is the group of diseases of the heart, including rheumatic fever.

Nevertheless, the teens are "the healthiest years of life," statisticians of the Metropolitan Life Insurance Company in New York report.

"The major threat to teen-age life" are deaths from violence, chiefly accidents, the statisticians find from study of the company's white industrial policyholders.

The chance of accidental death rises steadily through the teen-age period, but the hazard is much greater for boys than for girls. Thus in 1950-1952, the death rate from accidents for girls doubled from ages 13-14 to 18-19 years, when it reached 14.7 per 100,000; the death rate for boys almost tripled over the same age range, reaching a level of 85.7 per 100,000 at 18-19.

Motor vehicle accidents are the leading cause of accidental death among teen-agers, and increase rapidly in relative importance during this period of life. At ages 18-19, motor vehicle fatalities accounted for almost two-thirds of all accidental deaths among boys, and for about four-fifths of those among girls.

Among teen-age boys, drowning ranked second as a cause of accidental death, with firearms third and occupational accidents fourth. Violent deaths are primarily responsible for the large excess of male over female mortality during the teen-age years, the statisticians found.

Almost six percent of deaths among girls of 18 and 19 were due to pregnancy and childbirth. This apparently reflects the recent tendency to early marriage and parenthood.

Mental and emotional problems "loom larger than ever before."

A high proportion of teen-agers have poor teeth and defective vision and many, particularly girls, show the effects of poor dietary habits.

Science News Letter, October 10, 1953

ENGINEERING

"Aluminum Skyscraper" Breaks Steel Skyline

➤ AN ALUMINUM intruder has thrust itself into the skyline in the city of iron and steel—Pittsburgh.

It is a skyscraper 410 feet tall which, except for its basic steel framework, is essentially aluminum. It is the lightest building of its size in the world.

It is more than that: the building is the world's first "aluminum skyscraper." Its 30 floors of offices are warmed and cooled by aluminum panels in the ceilings. Its lights are hooked to aluminum wires. Water gushes through aluminum pipes.

The building belongs to the Aluminum Company of America. Designed before the Korean War, the building's main purpose is to dramatize the role aluminum can play in heavy construction.

One of the building's most outstanding features is its skin-like outer wall. Made of aluminum paneling, the wall was easily fastened to the framework from inside.

The interior wall literally was sprayed into place from a pneumatic nozzle. Made of perlite, a special lightweight concrete, it was built up on aluminum lath and metal reinforcing bars in a series of four one-inch layers. Four-man spraying crews were able to complete these back-up walls of the building at about four floors a week.

The building's windows also are unusual in design. Built into the tops of the aluminum outer-wall panels, the windows pivot 360 degrees about a vertical axis. This permits window washers to scrub the outside of the window while working inside the building.

The building sports 310,000 square feet of rentable floor space above the first floor. To support this office area, only 6,500 tons of structural steel were required. In comparison, an older building in Pittsburgh 24 stories high with 317,000 square feet of rentable area required 10,000 tons of structural steel in its framework.

Science News Letter, October 10, 1953

IN SCIE

BIOCHEMISTRY

Two Chemical Teams Report New Antibiotic

➤ A POTENT, new antibiotic, made by baring the basic chemical skeleton of the drugs terramycin and aureomycin, has been discovered.

The chemical, which has proved active against a wide variety of disease-causing bacteria in laboratory tests, is described by Drs. Lloyd H. Conover, Walter T. Moreland, Charles R. Stephens, Frederick J. Pilgrim and Arthur R. English of Chas. Pfizer & Co., Inc., Brooklyn.

The new antibiotic, called tetracycline, was shown in test tube studies to parallel the activity of Terramycin against germs associated with such ailments as typhoid fever, boils and urinary tract infections.

Tetracycline also was active in the tests against microorganisms linked with such diseases as bronchial pneumonia and "strep" sore throat, the Pfizer scientists say. No trials on animals or humans are reported.

The antibiotic activity of tetracycline is simultaneously described by a team of researchers of the American Cyanamid Company's Lederle Laboratories Division, Pearl River, N. Y., in the *Journal of the American Chemical Society*.

Participating in the Lederle work, conducted independently of the Pfizer studies, were Dr. J. H. Williams, Dr. James H. Boothe, J. Morton II, J. P. Petisi and R. G. Wilkinson.

Science News Letter, October 10, 1953

PSYCHOLOGY

Lasting Love Not Blind When Mates Rate Mates

➤ LASTING LOVE is not blind.

This was shown when Dr. Rosalind Dymond, a University of Chicago psychologist, studied 15 couples who had been married for an average time of over ten years.

Husbands and wives were asked to fill out a questionnaire twice, first as they would answer the questions themselves, and second as they thought their mates would reply to the same queries. Eight of the couples reported that they were happy together. The other seven were unhappy in their marriage.

The happy group were significantly more accurate in predicting what their mates would answer than the unhappy couples.

This shows, Dr. Dymond concludes, that husbands and wives who love each other most dearly also understand each other best. It also explodes another adage: Ignorance is not bliss.

Science News Letter, October 10, 1953

FIELDS

VETERINARY MEDICINE

"Mystery" Disease Is Attacking Cattle in West

➤ A WINTER "mystery" disease of young cattle has struck western cornbelt states, the American Veterinary Medical Association has learned.

The disease causes death in most cases. Outbreaks so far have fortunately been limited. It has been studied in about 50 herds by Drs. F. K. Ramsey and W. H. Chivers of the veterinary division of Iowa State College.

The disease, they said, usually affects only a few young cattle in each herd and has some of the characteristics of a former mystery condition, hyperkeratosis, once called X-disease.

Symptoms of the disease listed in the report included ulcers on the nostrils, muzzle, lips and mouth. Ulcers also were found in the stomach and intestines of most cases. The disease was marked by drooling, scours, emaciation and depression.

This disease is not contagious but the cause has not yet been found.

Science News Letter, October 10, 1953

TECHNOLOGY

Sonar Set Finds Fish And Aids Navigation

➤ A SONAR set to replace the "educated guesses" of fishermen has been developed.

The set not only pictures schools of fish on a television-like screen, but reveals the size of the school, where it is, which way it is going and how fast it is traveling.

Called the Sea Scanar, the Minneapolis-Honeywell device embodies the same sonar principle used successfully during World War II. However, the advantage of the Sea Scanar is said to be in its flexibility. It can "look" from side to side of the ship, and up and down as well.

The electronic device also aids navigation through tricky waters by showing every obstruction from seaweed to sand bars. Like conventional sonar, it also will measure the water depth beneath the boat.

Tiny bursts of sound too shrill to be heard by the human ear are beamed into the water from the scanning device. When the sound waves strike an object of density different from that of water, they are reflected to the ship.

The reflected waves are amplified and pictured on a cathode-ray tube. At the same time an audible signal calls attention to the echo. Objects such as ships and concrete walls produce a sharp "ping," but sand bars make scratchy loudspeaker noises.

The Sea Scanar can probe 1,600 feet ahead of the boat to reveal channel hazards for the navigator to avoid, or to indicate schools of fish. Its working range also can be adjusted to 800- and 400-feet distances. If desired, it can be made to cover only a 90- or 45-degree area instead of a 180 degree sweep from side to side. When a switch is flipped, the device automatically tracks schools of fish.

From the picture on the screen, fishermen can tell where to set their nets and when to pull them in for a maximum catch.

The Canadian whaling vessel, the Nahmint, captured three whales during the first week the device was in operation.

Science News Letter, October 10, 1953

ENGINEERING

British Detector Finds Reinforcing Rods

➤ BRITISH ENGINEERS have developed a machine that locates reinforcing rods in set concrete.

Design engineers at Kolectric Ltd., London, report that construction engineers using the device can double check on reinforcing rod positions after the concrete has been poured. This reveals whether the rods worked out of position while the concrete was filling the forms.

Called the "Covermeter," the device operates on an electromagnetic principle. Alternating current is fed into a probe held over the concrete. The current acts upon one leg of a U-shaped core of metal, making an electromagnet of it. A coil is wound around the other leg and indicates the nearness of reinforcing rods by the amount of current induced in it.

Science News Letter, October 10, 1953

ANTHROPOLOGY

Vanishing Wilderness Tribes to Be Studied

➤ TO GET a good look at honest-to-goodness wilderness tribes before western civilization gets to them is the purpose of a two-man expedition into Thailand, once known as Siam.

Detached cultures such as exist in the wilds of Thailand are disappearing because of spreading outside influences, the American Museum of Natural History, which is sponsoring the trip, finds. Robert W. Weaver, ethnologist, and Thomas L. Goodman, geographer, will record on film and tape as many as possible of the little-studied cultures of native peoples in Thailand's wilderness areas, and also collect artifacts.

Special feature of the expedition will be a study of the natives during the rain-drenching monsoon period from May to September. The scientists will be in fringe areas during this period where the rain, though still heavy, will not interfere with their work. The scientists will be the first to observe how the natives there adjust their lives to the torrential rains.

Science News Letter, October 10, 1953

MARINE BIOLOGY

Fossil Fish Missing Link in Man's Evolution

➤ THE "LIVING fossil" fish caught off Madagascar, third coelacanth ever found, should yield more secrets as "missing link" in man's evolution from sea creatures.

The two previous dawn-age fish were not very fresh when they were studied by scientists.

This rare fish has the longest lineage of any vertebrate animal. The new fish, as an actual survivor of a long-gone geologic age, should allow us to test our deductions concerning man's evolution, which heretofore have had to be made from dry bones alone, Dr. David Dunkle, associate curator of paleontology at the Smithsonian Institution, told SCIENCE SERVICE.

The coelacanth is a rather big fish, dark blue in color, with a metallic luster and big, goggle eyes. It has two back fins, the forward one having two sections, or lobes, which in a sense resemble crude limbs.

The family of lobe-finned fishes are believed to have given rise to amphibians, the first true, four-legged, partly land animals, of which frogs and newts are examples.

The ancient group of lobe-finned fishes is known as the crossopterygians. Because they were thought extinct, there is no common name for the family. These fishes originated in the Devonian age, about 300,000,000 years ago. Their nearest relatives among fish still abundant are the sturgeons and the bowlfish, or dogfish, of the Great Lakes and other freshwater bodies.

The coelacanth (pronounced seal-a-kanth) is believed to have remained relatively unchanged in the formation of its brain and other soft parts of its head. These soft parts were missing in the other two specimens, one of which was caught in 1938 and the other in Dec., 1952. (See SNL, Jan. 17, p. 38.)

Science News Letter, October 10, 1953

INVENTION

Helmet-Mounted Pistol Is Fired by Blowing

➤ ALBERT B. De Salardi, now deceased, of Wilkinsburg, Pa., applied for a patent in 1949 to protect his helmet-mounted pistol designed to permit soldiers to shoot at an enemy while cutting barbed wire, carrying equipment or digging foxholes at the same time.

Easily detached from the helmet, the pistol is fired when the soldier blows into a tube running to his mouth. The recoil of the weapon is absorbed and evenly distributed to the head by sponge-rubber lining inside the helmet. The pistol is aimed when the wearer moves his head so that the cross-hair optical sighting system falls upon the enemy. The invention received patent No. 2,651,872.

Science News Letter, October 10, 1953

BOTANY

Leaves Brighten Autum

When summer ends in a shower of leaves, the brilliant colors of autumnal foliage are unmasked by the fading of stronger green of living chlorophyll. Earth's fertility renewed.

See Front Cover

By WATSON DAVIS

➤ THE BRIGHT colors of autumn leaves which everyone admires have actually been there all summer. Every leaf, no matter how brilliantly green during the verdant growing season, has within it the bright colors that appear when the shorter, cooler days bring the changes to autumn foliage.

One of the changes that occurs in the leaves when autumn comes is chemical breakdown of the chlorophyll. This material is involved in capturing the summer sunlight. It uses its energy to transform the carbon dioxide of the air and the water from the soil into food. The sugar, starch and protein thus make green growing things luscious food for animals.

At the coming of autumn a chemical transformation takes place in the leaf as the tree puts the liquid foodstuffs of its foliage back into its limbs and trunk. The green matter, the all-important chlorophyll, breaks down and becomes colorless. The bright leaf colors that have been hidden in the growing season become unmasked and shine forth.

Two general classes of chemical compounds are responsible for the coloration of the dying leaves. These are carotinoids, which are responsible for the yellows, and anthocyanins, which gives the reds and the purples.

Chlorophyll Masks Colors

The carotinoid pigments present in all the leaves do not have a chance to show themselves when, during the summer, the chlorophyll, with its abundant green coloring, is dominant.

Chlorophyll is always being both formed and destroyed in leaves, but in autumn destruction goes on faster than formation, finally reducing it to a low point that permits the yellow carotinoids to be seen. If no other masking pigment is present, such leaves become pure yellow or orange, like tuliptree, willow and sassafras.

The other class of pigments, the anthocyanins, are dissolved in the cell sap. With the exception of a few purple-leaved or bronze-leaved plants, these pigments are also concealed by the more abundant chlorophyll, and show themselves only when it has been sufficiently broken down. At the same time, certain changes in the carbohydrate content of the leaves may cause an actual increase in the amount of the anthocyanins present. Thus we get the strong reds and purples of sumac, blackberry, sweet-gum, the oaks, etc.

Trees like maples, which sometimes show a gorgeous mottling of yellows and reds, may have local patches of anthocyanins masking out the carotinoid ground-color.

Combinations of the purples, purple-reds, oranges and true reds make all the varied colors we find in autumn leaves—and in the skins of autumn fruits as well. Leaves of a clear yellow, such as you sometimes find on hard maples, have no purple pigment in the sap. Leaves of a strong, deep wine-red are colored by a combination of purple sap-pigment and red carotin in the cells. The changes that may be rung on this color-chime are literally endless.

Even more remarkable than the wonder of leaf coloring, though much less conspicuous, is the provision made by the leaves for their falling off. They do not just snap off and drop, as a dead twig might. That would leave the tree covered with thousands of tiny, open wounds through which bacteria and fungus spores might enter, thus causing disease and decay. At the point where the leaf-stem is later to detach itself from the twig, a double layer of specialized, corky cells forms, finally cutting off the sap flow to and from the leaf. When it is complete, the union between the two layers becomes dried out and weak, and finally a little puff of wind finishes the job, letting the dead leaf drift down to earth, as shown on the cover of this week's SCIENCE NEWS LETTER.

Botanists have given this double layer a special name, "absciss layer." But that is only Latin for cut-off layer, and that is exactly what its function is. The tree or shrub is thus able to bandage its wounds before they actually exist. That is a trick that surgeons and first-aiders would give a good deal to be able to do for humans.

Bonfires Rob Soil

Poetically there may be sadness because leaves must die, fall from the trees and molder in the earth. Such a view does not fit in with the cycle of life in forest and field. The dead leaves must return to the soil the substances that the soil originally gave them, if the earth is to remain fruitful and new crops of leaves are to be produced in succeeding springs.

Leaves, despite their beauty and brilliance, become a nuisance when they fall

END OF A SEASON—To the tree shedding its foliage after a growing season, autumn is but a natural turning point. The living plant prepares for winter ahead and the spring that lies beyond.

to the ground. The brisk autumn chill may be pleasantly warmed by bonfires of leaves, but this mode of leaf disposal is frowned upon by firemen, health officials and good gardeners. There is a real danger of setting off forest or field fires when leaves are carelessly burned. A little smoke may give a spicy odor to the autumn air, but too often leaf-burning pollutes the atmosphere with smoke and smog. The real crime of burning leaves is that they cannot then be used in the green growth of future years.

Life Giving Humus

Trees are the reincarnations of their own dead forebears. Without the decaying leaves of yesteryear and the moldering logs and stumps of the last generation, there would not be life enough in the soil to sustain the new trunks that grow out of it.

The mass of dead but life-giving material is called humus. The enriching processes of the forest soils are actually different from those of garden and field. In open spaces bacteria largely attend to the task of returning dead things to the dust whence they came, but in the forest the work is done primarily by fungi. A large share is done by the higher fungi, the large showy plants that we call mushrooms, which are sometimes edible and sometimes poisonous.

Bacteria do play a small part, and insects, millepedes, worms and microscopic forms do their share. The dark world of the humus upon the floor of the forest is really a seething complex of life.

Getting rid of the leaves in yard and garden tempts the tidy householder to use the torch or otherwise dispose of leafy litter, but the cult of the compost heap is growing. More and more, where there is space for it, this place for the regeneration of fertile material will be found tucked away unobtrusively and frugally.

The dead leaves can be added, covered with a layer of soil, and in not many months, almost by the time a new growing season comes, the nuisance of fall can be converted into the fertile humus so much needed in spring.

Science News Letter, October 10, 1953

PLANT PATHOLOGY

Plant Hormone Checks Tumor-Like Growths

➤ A POTENT, new plant "hormone," which helps plants to grow normally, was reported to the American Institute of Biological Sciences meeting at Madison, Wis.

R. H. Roberts and Miss B. Esther Struckmeyer, University of Wisconsin horticulturists, have found that the hormone has the physiological property of regulating some tumor-like growths made by plants. The hormone is as yet only partly identified chemically.

The hormone was isolated during investigations conducted to find the growth substance which causes plants to blossom. The new hormone appears in plants at the time the blossom stage starts.

The scientists found the hormone would inhibit heavy callus growth in wounded plants with resulting smooth healing. Many chemicals or so-called growth regulators cause distortion of plant growth. An example is the weed-killer 2,4-D. The new hormone will inhibit the injurious effects of this growth substance. It actually has the effect of keeping tissues normal and preventing uncontrolled division of cells.

This may be interesting in cancer research and the possible role of the new plant hormone in animal tumor work is being investigated.

Research in the use of the hormone is being handicapped because it is not water soluble. Injections in plants to date have been in crystalline form. A search is being made for a way to convert the substance into a more soluble form.

Science News Letter, October 10, 1953

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION: Showing the Operations, Expenditures and Condition of the Institution for the Year Ended June 30, 1952—A. Wetmore, Secretary—*Govt. Printing Office*, 461 p., illus., $2.75. Special articles on a variety of scientific subjects are contained in an appendix.

BIOCHEMISTRY AND PHYSIOLOGY OF NUTRITION: Volume 1—Geoffrey H. Bourne and George W. Kidder, Eds.—*Academic Press*, 569 p., illus., $13.00. In this work the attempt is made to bring together in one book the most important parts of the vast amount of research in the field of nutrition.

CHROMATOGRAPHIC METHODS OF INORGANIC ANALYSIS: With Special Reference to Paper Chromatography—F. H. Pollard and J. F. W. McOmie—*Academic Press*, 192 p., illus., $5.50. Providing an introduction to the subject in non-mathematical language, and enough practical details so that the beginner can perform experiments.

COMMUNICATION: From Cave Writing to Television—Julie Forsyth Batchelor—*Harcourt, Brace*, 116 p., illus., $2.50. A book for children telling about the many ways of conveying thought that have been used by man throughout history.

ENRICHING THE YEARS—Thomas C. Desmond, Chairman—*New York State Joint Legislative Committee on Problems of the Aging*, 199 p., illus., paper, single copies free upon request direct to Senator Thomas C. Desmond, 94 Broadway, Newburgh, N. Y. Specialists here report on the progress made recently toward enlarging understanding of aging persons and the main problems of later life.

FIDDLER CRAB — Mary Adrian — *Holiday House*, 44 p., illus., $2.00. A nature story for children.

FLOOD CONTROL POLITICS: The Connecticut River Valley Problem, 1927-1950 — William Edward Leuchtenburg — *Harvard University Press*, 339 p., illus., $5.00. In any river valley, the author points out, the attempt to provide flood control inevitably entails conflict; it is intensified when the river crosses state lines. Conflict in the Connecticut valley is typical of political struggles of the Franklin Roosevelt era.

FRANZ BOAS: The Science of Man in the Making—Melville J. Herskovits — *Scribner's*, 131 p., $2.50. A leading anthropologist tells the story of the life of a colleague and the influence of his ideas on our thinking about other peoples.

GREAT MEN OF SCIENCE: A History of Scientific Progress—Philipp Lenard—*British Book Centre*, 389 p., illus., $3.25, translated from the 2d German edition. Something about the lives and work of leading scientists from Pythagoras of Samos to Friedrich Hasenohrl of Vienna.

HANDBOOK OF SELECTED BIOLOGICAL REFERENCES ON WATER POLLUTION CONTROL, SEWAGE TREATMENT AND WATER TREATMENT—William M. Ingram—*Govt. Printing Office*. Public Health Service Publication No. 214, 66 p., illus., paper, 30 cents. References selected largely for their availability and their potential usefulness to those not trained primarily in biology.

HARVARD CASE HISTORIES IN EXPERIMENTAL SCIENCE: Case 7, Pasteur's and Tyndall's Study of Spontaneous Generation — James Bryant Conant, Ed.—*Harvard University Press*, 61 p., paper, $1.25. These case studies are intended for the student of the social sciences who needs to be able to relate developments in the natural sciences to those in other fields.

HEALTH MANPOWER SOURCE BOOK: 2, Nursing Personnel—Helen G. Tibbitts and Eugene Levine—*Govt. Printing Office*, 88 p., paper, 40 cents. General hospitals employ four times as many nurses per patient today as in 1938, but modern techniques demand more of the nurse.

HIGH JUNGLES AND LOW—Archie Carr—*University of Florida Press*, 226 p., illus., $4.50. An invitation to ramble with the naturalist author among the delights of the tropic jungles.

HOW NATIONS SEE EACH OTHER: A Study in Public Opinion—William Buchanan and Hadley Cantril—*University of Illinois Press*, 220 p., $5.00. Results of a public opinion survey conducted by UNESCO in nine countries to find out what people of various nations think of each other and whether the "bi-polar world" is a reality.

HOW TO PRINT POSTERS: A Process Developed at the Regional Fundamental Education Centre for Latin America — Jerome Oberwager — UNESCO's *Education Clearing House*, 28 p., illus., paper, limited number free upon request direct to publisher 19, Avenue Kleber, Paris 16e, France. Describing a process developed at Patzcuaro for use in connection with the literacy campaign. It makes possible the quick and cheap production of posters.

HUMOUR AND HUMANISM IN CHEMISTRY — John Read—*British Book Centre*, 388 p., illus., $4.50. These miscellaneous notes in lighter vein deal with much more than chemistry.

INTERGOVERNMENTAL RELATIONSHIPS IN HIGHWAY AFFAIRS—Norman Hebden and Ralph S. Lewis — *National Academy of Sciences — National Research Council*, Highway Research Board Bulletin 66, 15 p., paper, 30 cents. The principles suggested in this bulletin are drawn largely from a recently completed pilot study in Maryland.

INVESTIGACIONES ARQUEOLOGICAS EN LA SABANA DE BOGOTA, COLOMBIA (CULTURA CHIBCHA)—Emil W. Haury and Julio Cesar Cubillos—*University of Arizona Press*, 104 p., illus., paper, $1.00. These people are frequently considered to have had one of the three highest native cultures of Central and South America, but the study reported here indicates the importance was probably greatly exaggerated. Report in Spanish with summary in English.

INVESTIGATION OF WIND FORCES ON HIGHWAY BRIDGES—G. S. Vincent—*National Academy of Sciences—National Research Council*, Highway Research Board Special Report 10, 30 p., illus., paper, 60 cents. Report of tests conducted on scale models.

KEEPING CHICKENS IN CAGES: A Description of the Outdoor Individual Cage System of Poultry Management as Developed Mainly in Southern California—Roland C. Hartman—*Hartman*, 3d ed., 237 p., illus., $3.50. A working manual for poultrymen.

THE LIFE AND WORK OF SIGMUND FREUD: Volume 1, The Formative Years and the Great Discoveries 1856-1900 — Ernest Jones — *Basic Books*, 428 p., illus., $6.75. Not intended as a popular biography of Freud, the aim of this work is to relate Freud's personality and the experiences of his life to the development of his ideas.

LONE MUSKRAT — Glen Rounds — *Holiday House*, 124 p., illus., $2.25. A story for children about an old muskrat who had been driven from his home by a forest fire and had to establish new quarters in strange terrain.

MACHINES THAT BUILT AMERICA — Roger Burlingame—*Harcourt, Brace*, 214 p., $3.50. Telling the story of such basic inventions as the production line, the spinning jenny, cotton gin, McCormick reaper and six-shooter.

THE MARS PROJECT—Wernher Von Braun—*University of Illinois Press*, 91 p., illus., $3.95. Space travel, says the author, a rocket engineer, cannot be attained by any back-yard inventor, no matter how ingenious, but only by the coordinated work of scientists, technicians and

(See p. 238)

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FACTS ON FILE

What General Electric people are saying . . .

C. W. LaPIERRE

Mr. LaPierre is Vice President and General Manager—Aircraft Gas Turbine Division

". . . In my opinion, research and development organizations, including our many capable universities, should always be primarily interested in exploration which leads to establishing principles. They should not attempt, by themselves, to direct the course of aviation progress. For example, they should establish the operating limits on a particular material or the relative merits of different thermodynamic cycles. But they should not try to dictate how their findings should be used. This responsibility must be left to the designer. Research and development organizations should work with the industry in helping establish limitations and principles; they should anticipate problems and solve them. Their solutions make it possible for the aircraft industry to overcome obstacles that might otherwise delay progress for years.

But regardless of *who* conducts our research and development projects, or how they are conducted, the nation's efforts in this field must not be allowed to dwindle.

The Soviet has, and will undoubtedly continue to hold, the advantage of mass—mass of manpower and material. We cannot hope to overtake them on those two scores. But our system of government is such that it encourages freer thinking and more rapid development. Our defense lies in the ability to outdevelop them—to neutralize their ponderous weight of arms with more advanced machines and methods. Our nation is blessed with the brain power and facilities to press this advantage. Our danger lies in the curse of lethargy that would allow them to lie fallow.

at The Air Force Association
Washington, D. C.

A. W. SCHMITZ and H. L. PALMER

Mr. Schmitz is Manager of Equipment Engineering, Industry Control Department

Mr. Palmer is Manager of Electronic, Regulator and Aircraft Engineering, Industry Control Department

". . . Today's high production speeds require controls with swiftness of response that can no longer be supplied manually. Self-regulating controls are the answer. At the same time, there's a constant evolution of control principles and amplifying means to obtain even faster speeds of response, and more accuracy of performance.

In the 1930's, the amplidyne—or rotating amplifier—was applied in industry where the sensitive capabilities of electronic tubes weren't needed, and where there was reluctance to use such fragile equipment. In subsequent years, however, control equipments were designed using the electronic tube and amplidyne in combination. Today, by contrast, the trend is toward replacement of both types with the static, or magnetic, amplifier.

Of tremendous help to the engineer in solving the complex control problems that lie ahead will be mechanical and electronic calculating machines. For in addition to solving mathematical equations, they can be used to simulate the electric machinery for which the control is designed. Thus, a more thorough test of the control can be made in the factory prior to installation at the customer's plant. This new technique has already reduced installation and tune-up time to a high degree.

Controls of the future may well include computers and information-storage devices to permit measurement and integration of operating factors in a process. That is, the control itself will make necessary calculations and automatically correct the process to get the desired end product. When we reach this stage of control, our nation's industrial productivity will have no limits.

G.E. Review

C. F. GREEN

Dr. Green is Engineer—Advance Developments, Aeronautic & Ordnance Systems Division

". . . The successful conduct of the rocket flight of a complex piece of experimental equipment is an arduous undertaking. Not only is it necessary to have equipment operating properly and reliably without personal attention; but also it is necessary to co-ordinate a large field of operations involving final missile assembly, handling and firing details, a network of optical and radar tracking stations, a system of radar receiving stations, a range safety group for protection of inhabitants and for command cut-off of rocket motor power in the event of a probably dangerous trajectory and a recovery group. Because of the large number of people involved in a firing, the date and hour of firing is fixed considerably in advance. Deadlines are not easy to meet with varied pieces of laboratory type equipment. There are problems of doing adequate pre-flight check-out of equipment under difficult field conditions—such as extreme temperatures, sand storms, rain, hail and winds. In general, each flight, since it carries different equipment, separately engineered for its particular requirements, places special problems upon the missile men as well as the experimental agency or agencies, all working together with a common incentive to accomplish the planned objectives.

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GENERAL ELECTRIC

Books of the Week
from page 236

organizers in every branch of modern science. Such talent is already being rallied around the standard of space travel.

MASTER INDEX TO SUPREME PUBLICATIONS MOST-OFTEN-NEEDED RADIO AND TELEVISION SERVICING INFORMATION 1953 — *Supreme Publications*, 32 p., paper, free upon request (with 4 cents for postage) direct to publisher, 3727 West 13th St., Chicago 23, by readers mentioning the SCIENCE NEWS LETTER.

THE MEANING OF THE GLORIOUS KORAN—An Explanatory Translation by Mohammed Marmaduke Pickthall—*New American Library*, 464 p., paper, 50 cents. The translator, who is an English Muslin, explains that this work is not the "Glorious Koran" itself, but an attempt to present the meaning of the Koran and something of its charm in English. The Koran, he declares, cannot be translated but must be read in Arabic.

THE NURSING MOTHER: A Guide to Successful Breast Feeding—Frank Howard Richardson—*Prentice-Hall*, 204 p., illus., $2.95. To answer the questions of expectant mothers who want to know what preparations they should make for nursing the baby and those who doubt that it is possible. The author is licentiate of the American Board of Pediatrics.

ONE GENERATION AFTER ANOTHER — James Lee Ellenwood—*Scribner's*, 182 p., illus., $3.00. A humorous book intended to offer parents suggestions on dealing with their children.

PARRAKEETS—Herbert S. Zim—*Morrow*, 64 p., illus., $2.00. Beautiful drawings illustrate this book for children, telling how to raise, train and breed parrakeets.

THE PHILOSOPHY OF SHAKESPEARE — K. J. Spalding—*Philosophical Library*, 191 p., $3.75. Shakespeare is known to us mainly as a poet and dramatist, but Prof. Spalding has searched all his known works to find the underlying philosophy which unifies them.

PRELIMINARY SURVEY ON METHODS OF TEACHING READING AND WRITING: Part I—William S. Gray—*UNESCO's Education Clearing House*, 66 p., illus., paper, limited number of copies free upon request direct to publisher, 19, Avenue Kleber, Paris 16°, France. To wipe out illiteracy, the report indicates, it will be necessary to at least double the present facilities for primary education and literacy training, and to train hundreds of thousands of teachers.

PRELIMINARY SURVEY ON METHODS OF TEACHING READING AND WRITING: Part II—William S. Gray—*UNESCO's Education Clearing House*, 72 p., paper, limited number of copies free upon request direct to publisher, 19, Avenue Kleber, Paris 16°. This part contains a summary of suggested practices for teaching both children and adults to read and write.

PRESENT KNOWLEDGE IN NUTRITION: Prepared from Articles Published in the Journal Nutrition Reviews—*Nutrition Foundation*, 122 p., paper, $2.00. Bringing together the latest findings in this field.

PROBLEMS IN ORGANIC CHEMISTRY—Edward G. Rietz and C. B. Pollard—*Prentice-Hall*, 332 p., $3.95. Intended for use with a standard organic text, and planned to eliminate some of the student's after-class perplexities.

RELATIVITY AND REALITY: A Re-Interpretation of Anomalies Appearing in the Theories of Relativity—E. G. Barter—*Philosophical Library*, 131 p., $4.75. The author states that this is not an attempt to criticize the mathematical theory of relativity but to apply the criteria of a court of law to the evidence in such a way as to eliminate some of the logical difficulties.

REVIEW OF ASTM RESEARCH: As Studied by the Technical Committees of the Society—Administrative Committee on Research—*American Society for Testing Materials*, 22 p., paper, free upon request to publisher, 1916 Race Street, Philadelphia 3, Pa.

ROUND RIVER: From the Journals of Aldo Leopold—Luna B. Leopold, Ed.—*Oxford University Press*, 173 p., illus., $3.00. Informal notes and essays by a conversation pioneer.

SEPARATION OF GASES BY FREE DOUBLE DIFFUSION—F. A. Schwertz—*Mellon Institute*, 5 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

Science News Letter, October 10, 1953

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ENGINEERING

Auxiliary Motor Solves Trolley-Bus Problems

► TROLLEY-BUSES in Uerdingen, Germany, have been made more versatile by the addition of an extra motor to their power plants.

The spare motors permit the buses to go where no trolley wires exist. Thus motormen can extract their buses from traffic snarls by resorting temporarily to the extra motor, and transit companies can cut capital outlay by dispensing with turn-around loops at the end of the line.

A gasoline-powered motor coupled with a 140-volt, 13-kilowatt electric generator makes up the supplementary power plant. It drives the fully loaded electric buses, carrying 92 persons, about 11 miles an hour. A particular advantage of the auxiliary motor lies in its ability to power the trolley buses across railroad tracks where no trolley wires can be strung.

An experiment of the Uerdingen Waggonfabrick Company, the new system has been declared satisfactory. Modified buses equipped with the extra motor already have been supplied to transit companies in Rheydt and Solingen.

Science News Letter, October 10, 1953

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ECOLOGY

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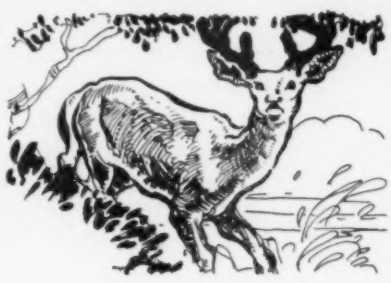

Deer

► FROM EARLIEST colonial days, deer have been regarded by Americans with more affection than almost any other form of wildlife.

Not only poets but the hunters who sought deer have praised their delicate beauty, quiet dignity and grace of movement.

When the white men first came to this country, the forests east of the Mississippi were full of one of the finest of all the species, the white-tailed or Virginia deer. This family is still the most widely-distributed, though it is outnumbered in certain areas by the black-tailed or mule deer.

The Indians were dependent upon deer. Deer gave the red man venison and pemmican for food, hides for warmth on winter nights, buckskin for clothing and antler-points for tools and ornaments.

In their turn, the white men who pushed beyond the settlements became quite as dependent upon the deer as the Indian tribes who fought the Europeans' coming. French trader and English pathfinder were alike in this: Boone and Joliet both traveled in buckskins and moccasins.

The white-tailed deer led a hard life, stalked not only by men but by predatory animals such as wolves and panthers. Yet they held their own against them all.

But the long-barreled guns of the whites dispossessed the Indians and all but wiped out many forms of wildlife. It took a terrible toll of deer. The ax and the plow swept away the native wilderness and destroyed the deer's natural home over vast stretches of territory. Men saw no good in forests when the land could be used for farming. The destruction perhaps was inevitable; pioneering was rough work, and the settlers needed both land and meat.

The low point in the continent's deer population came and went with the turn of the twentieth century. By that time, the reckless hunting by Americans, without thought of the consequence, was coming to an end. They began to make amends for past wrongs. Rigid hunting seasons were enforced, with strict limits on numbers of deer which could be taken.

Predatory animals had been all but pushed into extinction. And the westward course of agriculture helped the deer to return. Abandoned farms, particularly in New England, returned to a semblance of the wilderness they once were. As the brush and trees came back, so did the deer.

Science News Letter, October 10, 1953

Questions

DENTISTRY—Why is high speed drilling an aid to patients? p. 228.

• • •

MEDICINE—What is the best way to treat 'flu-like colds? p. 231.

• • •

METEOROLOGY—How can radar help to give passengers smoother airplane rides? p. 228.

• • •

PSYCHIATRY—What is the chief occupational disease of dentists? p. 230.

• • •

PUBLIC HEALTH—What is the chief disease killer of teen-agers? p. 232.

• • •

Photographs: Cover and p. 234, Fremont Davis; p. 227, Indiana University; p. 229, General Electric Company; p. 231, Firestone Tire & Rubber Co.; p. 240, Bison Metals.

A Key to Precious Stones

By L. J. SPENCER, *Formerly Keeper of Minerals, British Museum*

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HOOK-ON ARM rest for motorists attaches to the front seat and provides support for the driver's right arm. Because of its flat surface, the arm rest also can be used as a tiny table to hold drinks and sandwiches at drive-ins.

Science News Letter, October 10, 1953

FLOOR MAT, which can double as an auxiliary auto seat cushion, combines the springy resilience of foam rubber with the toughness and beauty of plastic-coated fibers. The manufacturer reports the plastic-coated fibers and foam rubber are firmly joined and will not separate. Washable in soap and water, the mat is particularly useful in kitchens, bathrooms and bedrooms.

Science News Letter, October 10, 1953

HARD OVERLAY material extends the life of metal surfaces subject to heavy wear. Available in paste and powder form, the material is painted on the metal surface, then melted with a torch or carbon arc. The overlay bonds to the metal, forming a "skin thick" film of a tough surface designed to make the metal last longer.

Science News Letter, October 10, 1953

ALUMINUM CHAIN has been developed for use as decorative fencing around lawns, monuments, and restricted areas in parks and on campuses. One-third as heavy as an iron chain the same size, the aluminum chain also is comparatively strong and will not rust or corrode, the maker reports. It is shown in the photograph.

Science News Letter, October 10, 1953

NYLON ELASTIC bandage, particularly good for taping sprained ankles and wrists, is non-constricting and retains its high elasticity for long periods. Cotton is woven into the soft fabric to absorb perspiration. The bandage layers adhere slightly to each other, providing a firm non-slip bandage in use.

Science News Letter, October 10, 1953

TURRET-LENSED still camera features normal, telephoto and wide-angle lenses that twirl into position at the flip of a finger. Focusing is done through the camera's eye-level ground glass viewer. The complete unit consists of camera, turret and a special pistol-like grip designed to improve camera steadiness at slow shutter speeds.

Science News Letter, October 10, 1953

SOAP STAND holds a bar of soap slightly up in the air on four plastic prongs so that the cake is not resting in a pool of water in the soap dish or on the surface of basins, bathtubs and sinks. The butyrate plastic stand is equipped with a suction cup for gripping slippery porcelain surfaces.

Science News Letter, October 10, 1953

HEATING PAD for motorists plugs into a cigarette lighter and warms the user's back. The manufacturer reports a special harness has been developed to hold the pad on farmers' backs as they use the pad while running tractors during the nippy winter months.

Science News Letter, October 10, 1953

THE CHEMISTRY WE USE

a compilation of "Home Lab" experiments, a monthly feature of CHEMISTRY magazine. Written by Burton L. Hawk . . . and designed for a simple but adequate home laboratory in which real chemical preparations can be made.

The World We Live In
The Air We Breathe
The Water We Drink
The Food We Eat
The Clothing We Wear
The Coins We Spend
The Drugs We Take
Lesser-Known Elements We Study
Other Materials We Use

A PRACTICAL INTRODUCTION TO THE CHEMISTRY OF EVERYDAY THINGS

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10-10-3

Do You Know?

The terms "bugs" and "insect" are not synonymous; the true *bug* is a member of one particular family of insects, the *Hemiptera*; this family has over 55,000 known species, of which more than 4,000 are found in North America alone.

A pound of *germanium*, the element used in the manufacture of new, revolutionary electronic devices called transistors, is the yield of 20 freight-car loads of zinc ore.

An international agreement to help cut world *opium* production from 2,000 to 500 tons yearly, the amount needed for medical purposes, has been signed by 17 countries.

Eight North American animals *hibernate* during the cold winter months; these are the jumping mouse, badger, bat, gopher, woodchuck, chipmunk, raccoon, and bear.

The use of new machines and methods in *agriculture* have increased the per-acre yield of the nation's croplands by 25% in 20 years.